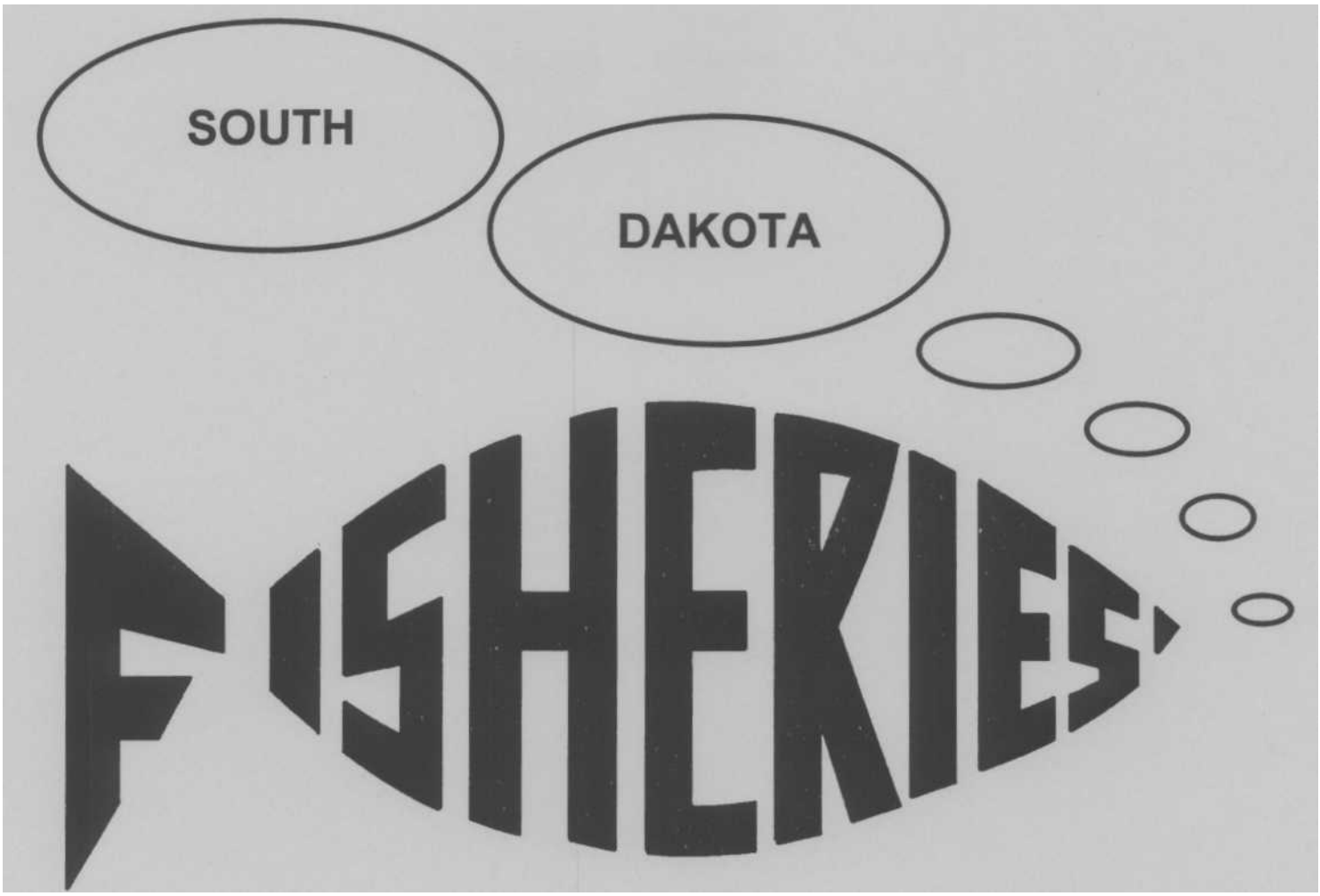
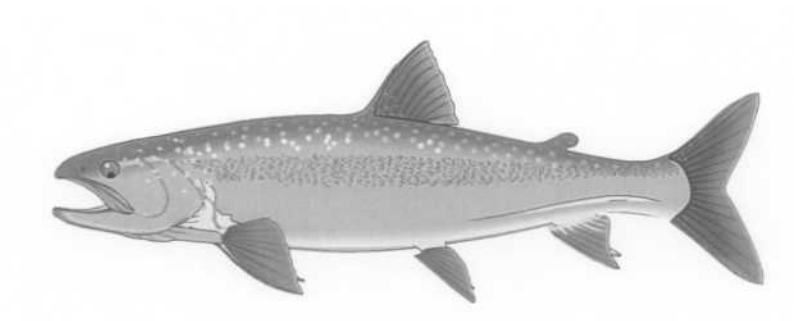


MCNENNY STATE FISH HATCHERY
2002 ANNUAL PRODUCTION REPORT

South Dakota
Department of
Game, Fish and Parks
Wildlife Division
Joe Foss Building
Pierre, South Dakota 57501-3182

Annual Report
No. 04-05

McNENNY STATE FISH HATCHERY
2002 ANNUAL ***PRODUCTION REPORT***



BY
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DIVISION OF WILDLIFE
SOUTH DAKOTA DEPARTMENT OF GAME, FISH AND PARKS

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FACILITIES

McNenny State Fish Hatchery is located in Lawrence County, 10 miles west of Spearfish, South Dakota. The Department of Interior, Fish and Wildlife Service built the hatchery between 1949 and 1951. The facility was transferred to the South Dakota Department of Game, Fish and Parks on July 1, 1983.

The facilities include the main hatchery building, three residences, two garage/storage buildings, 24 covered concrete raceway, three production ponds, a display pond, and two setting ponds. The main hatchery building contains egg incubation and initial rearing facilities, feed storage, fish health laboratory, workshop, offices, and storage areas.

PRODUCTION UNITS

160 Heath incubator trays
35 fiberglass circular tanks, 6 feet diam. x 30 inches deep
6 fiberglass circular research tanks, 26" x 16"
1 fiberglass rectangular aquarium, 10' x 2' x 2'
8 covered outdoor concrete raceways, 300' x 8' x 2.5'
2 indoor concrete raceways, 60' x 6' x 1.5'
3 rock bottom ponds, total surface area 0.3 acres
1 earthen pond for display of adult fish and waterfowl

SATELLITE FACILITY

D.C. Booth Historical Fish Hatchery in Spearfish serves has a satellite facility for the advanced rearing of catchable and yearling trout. Three, rock bottom ponds with a total surface area of 0.3 acres, five 85' x 8' x 2.5' and two 85' x 12' x 2.5' concrete raceways were used from March through September 2001. Water is supplied by a diversion on Spearfish Creek.

HATCHERY STAFF

The hatchery staff consists of the manager-fish health specialist, assistant manager, hatchery biologist, two conservation technicians and one summer college intern, and one seasonal employee.

PRODUCTION DATA

The South Dakota Department of Game, Fish and Parks fisheries management program has been divided into four programs based on habitat type. Fisheries managers use hatchery fish in the waters the four fisheries programs based on the annual request. The annual production data and costs have been developed for each of the four fisheries programs: streams, small lakes and ponds, large lakes and reservoirs, and the Missouri River. Table 1 summarizes the annual production costs at McNenny State Fish Hatchery

during 2002, for each fisheries program. The total cost is determined based on the production and distribution cost of each year class lot for that SAM Program during the calendar year.

Table 1. 2002 Annual Production Cost Summary at McNenny State Fish Hatchery for each of the Four Fisheries Programs.

PROGRAM	SPECIES	SIZE (#LB)	NUMBER STOCKED	WEIGHT STOCKED	PROGRAM COST	COST/ FISH
STREAMS (ST)	RBT	CAT(1.87)	1,600	855	$4,441.00	$2.78
	BNT	( )	19,900	9.326	$46,460.65	$2.33
TOTAL			**21,500**	**10,181**	**$50,901.65**	
SMALL LAKES &	RBT	FLG(12.0)	2,400	200	$1,364.29	$0.57
PONDS (SL)	RBT	FLG(7.26)	12,890	1,776	$8,271.58	$0.64
	RBT	CAT(1.64)	23,610	14,294	$67,377.06	$2.85
	RBT	LGCAT(0.28)	625	2,215	$11,603.64	$18.56
	BNT	CAT(2.04)	200	98	$845.43	$4.23
TOTAL			**39,725**	**18,583**	**$89,462.00**	
LARGE LAKES &	RBT	FLG(21.6)	60,000	2,781	$14,186.92	$0.24
RESERVOIRS	RBT	LGCAT(0.27)	460	1,674	$5,057.88	$11.00
(LR)	RBT	CAT(1.91)	8,900	4,649	$22,772.29	$2.56
	BNT	CAT(1.99)	7,920	3,987	$11,323.26	$1.43
	LAT	CAT(4.00)	8,000-CY03	0	$8,432.59	$1.05
TOTAL			**77,280**	**13,091**	**$61,772.94**	
MISSOURI RIVER	RBT	CAT(2.41)	21,300	8,851	$50,665.29	$2.37
MR	BNT	CAT(3.06)	13,000	4,243	$24,191.13	$1.86
	FCS	FLG(30 &10)	15,000-CY03	0	$292.82	$0.02
TOTAL			**34,300**	**13,094**	**$75,149.24**	
MONTANA-CY03	FCS	FLG(65.0)	200,000-	0	$5,271.11	$0.02
TOTAL				**0**	**$5,271.11**	
TOTAL CY02 PRODUCTION			*172,805*	***54,949***	*$282,556.62*	

Expenditures for 2002 are summarized numerically in Table 2 and Figure 1. Each expenditure category is described in Appendix B. Table 3 and Figure 2 provide a categorical analysis of hatchery labor distribution.

Production summaries have been developed for each production lot used in each fisheries program during the calendar year. The summaries include information on the source of the lot, weight gained in the calendar year, number stocked, feed conversion, fish culture man-hours, and costs. The production lot summaries are included in Appendix A. During 2002, a mean conversion of 1.03 was realized (55,415 lbs. fed / 54,037 lbs. gained).

FISH SPAWNING

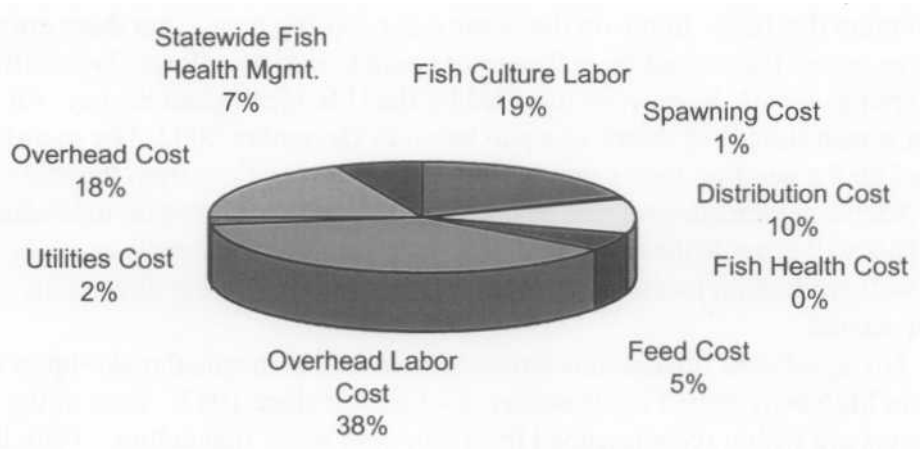
Hatchery staff spent 99 hours in 2002 to spawn two adult populations of trout and salmon. The two populations include; Cleghorn rainbow trout at Cleghorn Springs State Fish Hatchery and fall chinook salmon in Lake Oahe. Additional egg cost was incurred to

ship eggs from other hatcheries to McNenny State Fish Hatchery. Total expenditures for 2002 were $2,217.14

Table 2. Expenditures for 2002.

CATEGORY	COST
FISH CULTURE LABOR	$52,994.22
OVERHEAD LABOR (administration, maintenance, leave, etc.)	$107,350.64
SPAWNING COST	$2,217.14
FISH HEALTH COST	$449.84
STATEWIDE FISH HEALTH MANAGEMENT	$18,801.91
FEED COST	$14,253.37
UTILITIES	$5,657.88
OVERHEAD (supplies, materials and assets not assigned to other costs)	$52,168.22
DISTRIBUTION COST	$28,663.72
TOTAL	*$282,556.94*

Figure 1. Expenditure Distribution for 2002.



FISH STOCKING

In previous annual reports we have provided the annual accumulated production cost for stocking individual waters in the four fisheries programs. It was felt that this might be of some value to fisheries managers in the evaluation of individual waters. We have not prepared these costs for 2002. Fisheries managers have found it easier to have an assigned average value for a particular size and species of salmonid to determine stocking cost. Eight Hundred and seventy two man-hours were used stocking salmonids at a cost of $28,663.72 in 2002.

Table 3. Work Time Expenditures for 2002.

CATEGORY	HOURS	PERCENT
FISH CULTURE	3,365	31.3%
FISH DISTRIBUTION	872	8.1%
FISH SPAWNING	99	0.9%
FISH HEALTH	2	0.00%
STATEWIDE FISH HEALTH MANAGEMENT	589	5.5%
EQUIPMENT MAINTENANCE	288	2.7%
BUILDING AND GROUND MAINTENANCE	1,299	12.1%
ADMINISTRATION	2,570	23.9%
INFORMATION AND EDUCATION	228	2.1
NON-HATCHERY ASSISTANCE	131	1.2%
LEAVE AND HOLIDAYS	1,169	10.9%
NATL. WILD FISH HEALTH SURVEY	134	1.3%
TOTAL	***10,746***	***100.00***

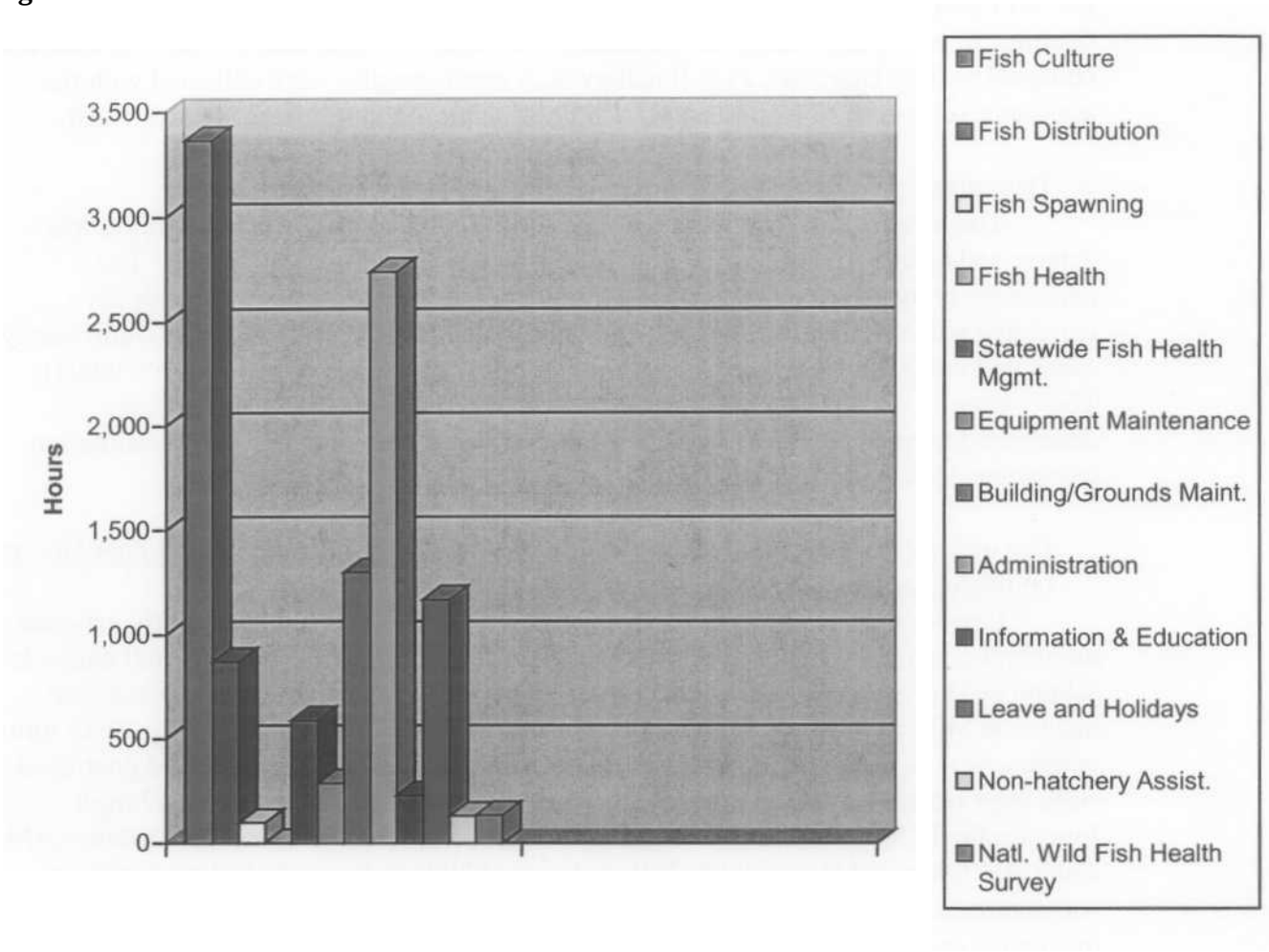
SUPPLY WATER AND QUALITY

It has been difficult to accurately determine measured flows from the three wells and springs that comprise the water supply for McNenny State Fish Hatchery. There is one common discharge flume on the wastewater settling ponds, but there are two other discharge points that do not have flumes or weirs to measure flows. Two of the half dozen springs on site have weirs installed by the U.S. Geological Survey. An ultrasonic doppler transit time flow meter was purchased in December 2002. The transducers will be installed on the aeration tower supply line to measure the flow from the three artesian wells. Additional transducers will be purchased to measure flows on individual rearing units. This will provide the necessary flow data from the three wells to see how close the actual well production meets the appropriated water right for the three wells of 5.46 cubic feet per second.

No significant fluctuations have occurred in the chemical make-up of the water supply at McNenny State Fish Hatchery as observed since 1983. Most of the chemical parameters are within recommended levels for cold water fish culture. High levels of carbonate-bicarbonate alkalinity, sulfate, and total dissolved solids contribute to excellent fish grow. High alkalinity levels also provide pH buffering and reduce the toxicity of metabolic ammonia. Gas levels are checked monthly for various rearing units. Gas, pH, and ammonia are monitored if suspected of causing culture problems.

Approximately 500 gallons per minute of Spearfish Creek water is diverted to the D.C. Booth Historical Fish Hatchery for use in advanced rearing of catchable trout from March through September. Currently no chemical water quality parameters are monitored on a regular basis. Gas levels are checked periodically.

Figure 2. **Time Distribution for 2002.**



EFFLUENT WATER QUALITY

No discharge violations occurred during 2002. A new South Dakota Surface Water Discharge permit was issued on October 1, 2002. Quarterly Biochemical Oxygen Demand (BOD) samples from fish production outfalls 1 and 2 are the only new required sampling. If BOD samples are below 3 mg/L during the next four quarterly samples the sampling requirement will be removed from the permit.

FISH CULTURE ACTIVITIES

Several investigations into novel fish rearing techniques were performed in 2002. They are as follows:

1. Effects of smelt diets on walleye and chinook salmon reproduction -

Will Sayler and Rick Cordes collected the walleye samples from Lake Oahe during the third year of this five-year study evaluating smelt thiaminase levels, and adult and egg thiamine levels in both walleyes and chinook salmon. Walleye embryo survival data was collected at Blue Dog State Fish Hatchery, and smelt samples were collected with the assistance of Wayne Nelson-Stastney. Chinook salmon samples were also collected.

2. Determination of the reliability of overripe salmon egg estimates -

The number of overripe eggs in spawn of landlocked fall chinook salmon was determined quantitatively from digital images recorded prior to fertilization. The percentage of overripe eggs recorded from the digital images was not significantly correlated with survival at either egg eye-up, fry hatch, or swim-up, but was significantly correlated with the visually-estimated number of overripe eggs (? = 0.914, $p < 0.001$). There was also no significant difference between the percentage of overripe eggs determined from using either method. Neither the digital images nor visual-estimation techniques for assessing overripe eggs are reliable predictors of egg survival.

3. Use of Low Vacuum Electron Microscopy to Quickly Estimate Bacterial Populations on Incubating Salmonid Eggs -

Low vacuum scanning electron microscopy (SEM) was used to quickly estimate microbial populations attached to the external egg membrane of landlocked fall chinook salmon eyed eggs. The eggs required no preservation or treatment prior to placement inside the SEM in low vacuum mode, and could be viewed for approximately 10-15 min before severe desiccation occurred. Bacterial numbers were estimated for 7 d post-eyed stage eggs reared in vertical-flow tray incubators and treated with either 1,667 mg/L formalin for 15 min daily in the AM or 1,667 mg/L formalin for 15 min twice daily (AM and PM). Estimated bacterial levels were twice as high on the eggs, and percent hatch was significantly lower, in the AM-treated trays compared to the eggs in trays receiving treatments in both the AM and PM. As a result of estimated bacterial loads, three trays in the AM group were shifted to both AM and PM treatments at eight days post-eyed stage. Survival to hatch in these was significantly greater compared to trays that were not switched.

4. Hatchery influences on post-stocking survival (Lake Oahe) -

Tag returns from fall chinook salmon subjected to different rearing strategies were obtained for the second year in 2002. The results were identical to 2001, with a six fold higher in salmon reared at lower densities in the circular tanks versus those reared at normal densities prior to stocking. Tag returns from salmon reared with high water flows were slightly above those of fish reared at normal flows.

5. Hatchery influences on post-stocking survival (Lake Sharpe) -

This was initiated in 2001 and was a replicate for the study started in 2000. Differential fin clips were performed on McConaughy rainbow trout to identify them as being either fed by hand, or by belt feeders. These fish were stocked in 2002.

6. Use of partial covers on the circular tanks -

Experimentation into the use of partial tanks covers on the circular tanks continued with different species, strains, and sizes of fish in 2002.

7. Survey on visitation policies at public fish hatcheries –

In a cooperative project with Gary Whalen, Michigan Hatchery Chief, a survey was distributed via the AFS Fish Culture Section newsletter and other means to ascertain the current status of hatchery visitation policies in the United States in 2001. The data was collected and analyzed in 2002, with over 100 hatcheries from across the continent responding.

8. Reduction in Formalin Concentration after Egg Eye-up -

In the fall of 2002, the use of formalin after egg eye-up at concentrations less than 1,677 mg/L was evaluated. Initial results indicate that 1,000 mg/L is the lowest concentration to still provide significant benefits.

Hatchery personnel had two manuscripts published during 2002:

Barnes, M. E., W. A. Sayler, and R. J. Cordes. 2002. Survival of rainbow trout sac fry subjected to various formalin and hand-picking treatment regimes during culture in vertical-flow incubators. North American Journal of Aquaculture 64:129-135.

Barnes, M. E., W. A. Sayler, and R. J. Cordes. 2002. Initiation of feeding during hatchery rearing of landlocked fall chinook salmon fry. Proceedings of the South Dakota Academy of Science 81:137-141.

Hatchery personnel had several manuscripts accepted for publication:

Barnes, M. E., and D. J. Durben. In Press. Use of partial tank covers during hatchery rearing of feral rainbow trout. North American Journal of Aquaculture.

Stephenson, J., M. Gabel, and M. E. Barnes. In Press. Microbial reduction in response to treatments of hydrogen peroxide and formalin on landlocked fall chinook salmon eyed eggs as determined by scanning electron microscopy. North American Journal of Aquaculture.

Barnes, M. E., M. H. Zehfus, J. A. Schumacher, K. S. Stock, F. Farrokhi, and R. L. Nutter. In Press. Thiamine influences on landlocked fall chinook salmon reproductive characteristics. Prairie Naturalist.

Pravecek, J., and M. E. Barnes. In Press. Lack of effect of iodophor on survival of westslope cutthroat trout eggs during water hardening. North American Journal of Aquaculture.

Barnes, M. E., R. J. Cordes, W. A. Sayler, and R. P. Hanten. In Press. Soft-egg disease in land-locked fall chinook salmon spawn with or without the presence of overripe eggs. North American Journal of Aquaculture.

Barnes, M. E., H. Stephenson, and M. Gabel. In Press. Use of hydrogen peroxide and formalin treatments during incubation of landlocked fall chinook salmon eyed eggs. North American Journal of Aquaculture.

Barnes, M. E., W. A. Sayler, R. J. Cordes, and R. P. Hanten. In Press. Potential indicators of egg viability in land-locked fall chinook salmon spawn with or without the presence of overripe eggs. North American Journal of Aquaculture.

Research Presentations

Poster and oral presentations on hatchery research were given at the Dakota Chapter American Fisheries Society meeting in Chamberlin, South Dakota in 2002 by Will Sayler and Mike Barnes. Oral presentations were also given by Mike Barnes at the South Dakota Academy of Science meeting in Sioux Falls, South Dakota and the Early Mortality Syndrome Workshop in Ann Arbor, Michigan.

FISH HEALTH

Two fish health case histories were documented for McNenny State Fish Hatchery for CY2002. They are as follows:

1. Swim-up rainbow trout fry in late February and early March suffered chronic mortality associated with bacterial gill disease for a seven day period. Efforts to improve water quality by changing circular tank flows and cleaning wasted feed and fecal material more thoroughly resulted in mortality returning to normal.

2. Swim-up rainbow trout fry in early November suffered chronic mortality associated with bacterial gill disease for a seven day period. Efforts to improve water quality by changing circular tank flows and cleaning wasted feed and fecal material more thoroughly resulted in mortality returning to normal.

STATE-WIDE FISH HEALTH SERVICES

Twenty salmonid importation permits were issued in 2002 to state, federal and private hatcheries, a research laboratory, one commercial fish out pond, and four private pond owners (Table 4).

Table 4. Salmonid Importation Permits Issued in 2002 (E-eggs and LF-live fish).

Permit #	**Permit Holder**	Source	Species	**Number**	**Date**
IP02-01	McNenny State Fish Hatchery	Ennis NFH, Ennis, MT	RBT-E	50,000	Jan. 02
IP02-02	Cleghorn Springs SFH	Ennis NFH, Ennis, MT	RBT-E	300,000	Jan. 02
IP02-03	Trout Haven Ranch, Buffalo Gap, SD	Balck Canyon Trout Farm, Grace, ID	RBT-E	75,000	Jan. 02
IP02-04	McNenny State Fish Hatchery	Ennis NFH, Ennis, MT	RBT-E	40,000	Feb. 02
IP02-05	Cleghorn Springs SFH	Ennis NFH, Ennis, MT	RBT-E	135,000	Feb. 02
IP02-06	Trout Haven Ranch, Buffalo Gap, SD	Troutlodge, Inc., Sumner, WA	RBT-E	200,000	March 02
IP02-07	Jerry Walker, Hill City, SD	Cedar Ridge Hatchery, Newcastle, WY	RBT-LF	75	May 02
IP02-08	Perry Norton, Hill City, SD	Cedar Ridge Hatchery, Newcastle, WY	RBT-LF	25	May 02
IP02-09	Jack Wilson, Custer, SD	Cedar Ridge Hatchery, Newcastle, WY	RBT-LF	50	May 02
IP02-10	Roxy Cowles, Newcastle, WY	Cedar Ridge Hatchery, Newcastle, WY	RBT-LF	25	May 02
IP02-11	Trout Haven Ranch, Buffalo Gap, SD	Troutlodge, Inc., Sumner, WA	RBT-E	100,000	June 02
IP02-12	Trout Haven Ranch, Buffalo Gap, SD	Black Canyon Trout Farm, Grace, ID	RBT-E	200,000	July 02
IP02-13	USFWS, Gavins Point, NFH, Yankton, SD	Ennis NFH, Ennis, MT	RBT-E	25,000	August 02
IP02-14	USGS, Fish Contaminant Field Research Station, Yankton, SD	Ennis NFH, Ennis, MT	RBT-E	10,000	Sept. 02
IP02-15	Chuck Franklin, Newcastle, WY	Cedar Ridge Hatchery, Newcastle, WY	RBT/ BNT-LF	30	Aug. 02
IP02-16	Trout Haven Ranch, Buffalo Gap, SD	Troutlodge, Inc. , Sumner, WA	RBT-E	250,000	Oct. 02
IP02-17	Trout Haven Ranch, Buffalo Gap, SD	Black Canyon Trout Farm, Grace, ID	RBT-E	300,000	Dec. 02
IP02-18	Lindstad Fish Hatchery, Spearfish, SD	Black Canyon Trout Farm, Grace, ID	RBT-E	125,000	Dec. 02
IP02-19	McNenny State Fish Hatchery	Soda Lake/Ten Sleep SFH, WY	BNT-E	60,000	Nov. 02
IP02-20	USFW Gavins Point NFH, Yankton, SD	Ennis NFH, Ennis, MT	RBT-E	25,000	Dec. 02

During 2002 four private fish hatchery inspections were provided for the two private trout hatcheries in the Black Hills area. The Department of Game, Fish and Parks, fish health lab at McNenny State Fish Hatchery and the U.S. Fish and Wildlife Service, Bozeman Fish Health Laboratory, conduct the inspections as a service to private hatcheries. The inspections provide the necessary annual fish health status of the facility to permit review by other states permitting importation of trout from these private hatcheries. Annual fish health inspections were conducted at Cleghorn Springs State Fish Hatchery and McNenny State Fish Hatchery in September. Feral fall chinook salmon from Lake Oahe received a fish health inspection during the annual fall spawning period run.

Two fish health case histories were documented in public waters or hatcheries in the state in 2002 with various types of *investigations* conducted (Table 5).

Table 5. Fish Health Case Histories 2002.

CH #	Date	Location	Major Species	Mortality Level	Suspect Cause
02-02FHC	07/02	Scott Lake	Black Bullheads	Moderate	*Aeromonas Sp.* And *Edwardsia tarda*
02-03FHC	07/02	Angotura Res. Irrigation Canal	Channel Catfish	High	Unknown

Fish Importation and Private Hatchery Regulation changes proposed to the South Dakota Department of Game, Fish and Parks Commission in October 2002 were adopted with minor modifications at the November Commission meeting. The fish health management policy will be updated and the three state hatcheries will update their fish health management plans.

VISITOR SERVICES

Eleven organized tours for approximately 600 students were conducted at the hatchery by hatchery staff. A tour was also conducted for the Booth Hatchery volunteers. Kelly Witcraft assisted at the department's state fair aquaria. In-school presentations were given at three grade school classes in Spearfish.

The *annual* Kids Fishing Day continued to grow in 2002, with over 150 children attending the June event. This education endeavor is a joint project with several federal agencies, the boy scouts, and numerous other volunteers.

MISCELLANEOUS ACTIVITIES

1. Personnel and Special Project Assistance

   Five personnel changes occurred during 2002. Kody Steinbrecher resigned in March to take a position with the State of Wyoming. Kelly Witcraft joined the staff has a conservation technician in April . Fritz Fonck retired in July after nineteen years of employment at McNenny at the age of 79 years. Kelly Witcraft resigned in September to pursue other interests. Rachel Ziegler (Sanders) and Eric Krebs were hired in late September to fill the two vacation conservation technician positions.

   In April 2002 Will Sayler assisted with walleye *spawning* crew at the Mobridge and also collected samples for the thiamine research on Lake Oahe. Rick Cordes and the hatchery staff collected tissue samples for the National Wild Fish Health Survey in late November and early December. Mike Barnes assisted the development and implementation of four Eagle Scout projects at the hatchery.

As part of Kids Fishing Day in 2002, hatchery staff presented a plaque to the Boy Scouts of America Troop 17 from Spearfish in recognition for all of their volunteer service to the hatchery. The Troop help recover one of the hatchery raceways as a community service project in 2002. In addition, four scouts completed their Eagle Scout projects in 2002 (Joe Hallenbeck, Tyler Batt, Dan Brady, and Brent Fletcher) in service to the hatchery and Department of Game, Fish and Parks.

In cooperation with Black Hills State University, hatchery staff arranged fisheries experience for 4 outdoor education students. From this project, the department received approximately 200 hours of volunteer labor, most of which was spent at McNenny. Additional activities included spawning at Cleghorn Springs. One BHSU student volunteered approximately 200 hours as part of his on-the-job internship in 2002. Three BHSU students conducted their Animal Behavior course projects out at McNenny.

Hatchery staff mentored high school student Wes Bouska during the summer as part of the American Fisheries Society Hutton Scholar program. Wes was paid by the Society and took part in every aspect of hatchery operations, as well as assisted regional fisheries staff in their duties.

2. Meetings, Training and Committees

Meetings attended included the Fisheries Staff winter and summer meetings, Dakota Chapter of the American Fisheries Society, Rocky Plains Fish Health Workshop, the Upper Missouri River Pallid Sturgeon Work Group, South Dakota Academy of Science, and the Early Mortality Syndrome workshop. The hatchery staff continues to work on various Department committees.

3. Maintenance Activities

Private contractors were used to build basement bathrooms in residence #2 and #3. Water control structures and pipes were replaced between pond #1 and pond #2 by a heavy contractor. Raceway concrete wall and floor cracks were repaired by a general contractor. Two raceway covers were replaced by the hatchery staff and the Black Hills fisheries staff. A new aluminum 1000-gallon fish distribution tank was installed on the 2 ton fish distribution truck.

The hatchery technicians preformed the following maintenance activities in 2002:

a. Continued to install belt feeders on the covered raceways.
b. Applied herbicides to the canada thistles on the hatchery grounds.
c. Removed materials from the hatchery attic and storage shed for disposal.
d. Graded hatchery entrance road and access roads around raceways to improve the gravel surfaces.

OPERATION RECOMMENDATIONS FOR 2002 THAT WERE ACCOMPLISHED

1. Replaced the existing water supply line between pond #1 and pond #2 and associated water control structures in June.
2. Raceway cracks were repaired.
3. Basement bathrooms were completed in residence #2 and #3.
4. Improved fish culture strategies were implemented for brown trout culture and resulted in brown trout production meeting fish management requests.
5. Replaced three of four raceway covers in CY2002.
6. Mike Barnes with the assistance of BHSU Biology Department initiated research projects to identify the cause of soft-shell egg disease in salmonid eggs.
7. Research efforts using formalin treatment regimes to prevent soft-shell egg disease were shown to be effective.
8. Continue to identify and make improvements in hatchery building and fish rearing units.

OPERATIONAL RECOMMENDATIONS FOR 2003

1. Investigate the use of egg incubation/hatching jars to replace the vertical incubation trays.
2. Prepare site for construction of pole building.
3. Clean waste materials adjacent to remote shed.
4. Develop and have on line by late spring of 2003 a web site for McNenny State Fish Hatchery linked to the South Dakota Department of Game, Fish and Parks web site.
5. Install fourth raceway cover.
6. Improve fish food handling, storage, and feeding procedures. Includes installation of additional raceway feeders.
7. Install ultrasonic doppler transit time flow meter on aeration tower supply line.
8. Replace controller and solenoid valve on domestic sewage lift station.

Appendix A. Production Lot Summaries.

RAINBOW TROUT -SHASTA			
LOT #	RBT-S-01	RBT-S-01	RBT-S-01
PROGRAM-CALENDAR YEAR-SIZE	SMALL LAKES & PONDS CY02 11" CAT	LARGE LAKES & RES. CY02 11"CAT	STREAMS CY02 11" CAT
SOURCE	ENNIS NFH	ENNIS NFH	ENNIS NFH
# 01/01/02	19,500	4,100	1,600
WT.(LBS.)01/01/02	4,600	946	340
# STOCKED 2002	18,950	3,900	1,400
WT. STOCKED	11,379	2,018	768
WT. GAINED	6,779	1,072	428
CONVERSION	0.75	0.75	0.75
# 12/31/02	0	0	0
WT. 12/31/02	0	0	0
FISH CULTURE MAN-HOURS	337	53	21
FISH CULTURE LABOR COST	$5,379.66	$850.71	$339.65
SPAWNING COST	$0.00	$0.00	$0.00
FISH HEALTH COST	$0.00	$0.00	$0.00
FEED COST	$1,250.59	$197.76	$78.96
UTILITIES	$709.79	$112.24	$44.81
OVERHEAD COST	$22,370.52	$3,537.58	$1,412.39
DISTRIBUTION COST	$4,118.84	$651.50	$658.97
TOTAL COST	$33,829.40	$5,349.79	$2,534.78
COST/FISH	***$1.79***	*$1.37*	***$1.81***

Appendix A. Production Lot Summaries.

RAINBOW TROUT -SHASTA (CONT.)				
LOT #	RBT-S-02	RBT-S-02	RBT-S-02	RBT-S-02
PROGRAM-CALENDAR YEAR-SIZE	SMALL LAKES CY02 LGF	STREAMS CY02 11" CAT	SMALL LAKES CY02 11' CAT	LARGE RES. CY02 11" CAT
SOURCE	ENNIS NFH	ENNIS NFH	ENNIS NFH	ENNIS NFH
# **01/01/02**	0	0	0	0
WT.(LBS.)01/01/02	0	0	0	0
# **STOCKED 2002**	750	0	0	0
WT. STOCKED	94	0	0	0
WT. GAINED	93	296	4,132	1,057
CONVERSION	0.96	0.96	0.96	0.96
# **12/31/02**	0	1,400	19,550	5,000
WT. **12/31/02**	0	297	4,142	1,060
FISH CULTURE MAN-HOURS	5	17	237	61
FISH CULTURE LABOR COST	$84.82	$269.96	$3,768.55	$964.03
SPAWNING COST	$1.50	$4.78	$66.67	$17.05
FISH HEALTH COST	$0.16	$0.50	$6.95	$1.78
FEED COST	$20.82	$66.28	$925.19	$236.67
UTILITIES	$9.74	$30.99	$432.64	$110.67
OVERHEAD COST	$306.90	$976.79	$13,635.50	$3,488.08
DISTRIBUTION COST	$257.53	$0.00	$0.00	$0.00
TOTAL COST	$681.47	$1,349.30	$18,835.50	$4,818.28
COST/FISH	*$0.91*	*$0.96*	*$0.96*	*$0.96*

Appendix A. Production Lot Summaries.

RAINBOW TROUT- CLEGHORN				
LOT #	RBT-C-01	RBT-C-01	RBT-C-02	RBT-C-02
PROGRAM-CALENDAR YEAR-SIZE	SMALL LAKES CY02 15" CAT	LARGE RES. CY02 15" CAT	SMALL LAKES & PONDS CY02 11" CAT	SMALL LAKES & PONDS CY02 SFG
SOURCE	CLEGHORN SPRINGS SFH	CLEGHORN SPRINGS SFH	CLEGHORN SPRINGS SFH	CLEGHORN SPRINGS SFH
# **01/01/02**	675	485	4,960	2,600
WT.(LBS.)01/01/02	992	687	19	9
# **STOCKED 2002**	625	460	4,660	2,440
WT. STOCKED	2,215	1,674	2,915	200
WT. GAINED	1,223	987	2,896	191
CONVERSION	1.56	1.56	0.85	0.85
# **12/31/02**	0	0	0	0
WT. 12/31/02	0	0	0	0
FISH CULTURE MAN-HOURS	72	59	159	10
FISH CULTURE LABOR COST	$1,142.49	$922.03	$2,407.77	$158.00
SPAWNING COST	$0.00	$0.00	**$0.00**	$0.00
FISH HEALTH COST	$0.00	$0.00	$12.89	$0.85
FEED COST	$473.53	$382.15	$654.23	$43.15
UTILITIES	$128.05	$103.34	$303.22	$20.00
OVERHEAD COST	$4,036.68	$3,257.08	$9,556.74	$629.51
DISTRIBUTION COST	$276.90	$393.28	$1,098.80	$511.20
TOTAL COST	$6,056.84	$5,057.88	$14,033.65	$1,364.29
COST/FISH	***$10.11***	***$3.02***	***$3.01***	***$0.57***

Appendix A. Production Lot Summaries.

RAINBOW TROUT - CLEGHORN (CONT.)				
LOT #	RBT-C-02	RBT-C-02	RBT-C-02	RBT-C-02
PROGRAM-CALENDAR YEAR-SIZE	SMALL LAKES & PONDS CY03 15" CAT	SMALL LAKES & PONDS CY02 LFG	STREAMS CY02 11" CAT	LARGE RES. & LAKES CYO1 SFG
SOURCE	CLEGHORN SPRINGS SFH	CLEGHORN SPRINGS SFH	CLEGHORN SPRINGS SFH	CLEGHORN SPRINGS SFH
# 01/01/02	1,065	12,915	215	63,830
WT.(LBS.)01/01/02	4	47	1	235
# **STOCKED 2002**	0	12,140	200	60,000
WT. STOCKED	0	1,682	87	2,781
WT. GAINED	1,225	1,635	86	2,546
CONVERSION	0.85	0.85	0.85	0.85
# 12/31/02	1,000	0	1,160	0
WT. 12/31/02	1,229	0	1,719	0
FISH CULTURE MAN-HOURS	67	90	5	140
FISH CULTURE LABOR COST	$1,018.48	$1,359.36	$71.50	$2,116.78
SPAWNING COST	$0.00	$0.00	$0.00	$0.00
FISH HEALTH COST	$5.45	$7.28	$0.38	$11.33
FEED COST	$276.74	$369.36	$19.43	$575.16
UTILITIES	$128.26	$171.19	$9.00	$266.58
OVERHEAD COST	$4,042.48	$5,395.46	$283.81	$8,401.74
DISTRIBUTION COST	$0.00	$287.46	$172.80	$779.81
TOTAL COST	$5,471.41	$7,590.11	$556.92	$12,151.40
COST/FISH	*$5.47*	*$0.63*	*$2.78*	*$0.20*

Appendix A. Production Lot Summaries.

RAINBOW TROUT - CLEGHORN (CONT.)					
LOT #	RBT-C-02	RBT-C-03	RBT-C-03	RBT-C-03	RBT-C-03
PROGRAM-CALENDAR YEAR-SIZE	LARGE RES. CY02 11' CAT	LARGE RES. CY03 11" CAT	SMALL LAKES CY04 15" CAT	LARGE RES. CY03 SFG	SMALL LAKES CY03 11" CAT
SOURCE	CLEGHORN SPRINGS SFH	CLEGHORN SPRINGS SFH	CLEGHORN SPRINGS SFH	CLEGHORN SPRINGS SFH	CLEGHORN SPRINGS SFH
# 01/01/02	5,320	0	0	0	0
WT.(LBS.)01/01/02	15	0	0	0	0
# STOCKED 2002	5,000	0	0	0	0
WT. STOCKED	2,631	0	0	0	0
WT. GAINED	2,616	5	2	54	18
CONVERSION	0.85	1.13	1.13	1.13	1.13
# 12/31/02	0	3,000	1,000	31,000	10,000
WT. 12/31/02	0	6	2.5	66	22
FISH CULTURE MAN-HOURS	143	9	4	96	32
FISH CULTURE LABOR COST	$2,174.98	$144.88	$57.95	$1,564.74	$521.58
SPAWNING COST	$0.00	$21.98	$8.79	$237.33	$79.11
FISH HEALTH COST	$11.65	$2.11	$0.84	$22.80	$7.60
FEED COST	$590.98	$2.48	$0.99	$26.79	$8.93
UTILITIES	$273.91	$0.52	$0.21	$5.65	**$1.88**
OVERHEAD COST	$8,632.72	$16.50	$6.61	$178.21	$59.41
DISTRIBUTION COST	$731.51	$0.00	$0.00	$0.00	$0.00
TOTAL COST	$12,415.75	$188.47	$75.39	$2,035.52	$678.51
COST/FISH	*$2.48*	*$0.06,*	*$0.08*	*$0.07*	*$0.07*

Appendix A. Production Lot Summaries.

RAINBOW TROUT-McCONAUGHY		
LOT #	RBT-M-01	RBT-M-02
PROGRAM-CALENDAR YEAR-SIZE	MISSOURI RIVER CY02 CAT	MISSOURI RIVER CY03 CAT
SOURCE	ENNIS NFH	ENNIS NFH
# **01/01/02**	20,900	
WT.(LBS.)01/01/02	3,901	0
# **STOCKED 2002**	21,300	0
WT. STOCKED	8,851	0
WT. GAINED	4,950	5,020
CONVERSION	1.26	1.02
# **12/31/02**	0	21,800
WT. 12/31/02	0	5,029
FISH CULTURE MAN-HOURS	201	326
FISH CULTURE LABOR COST	$3,021.07	$5,087.25
SPAWNING COST	$0.00	$94.86
FISH HEALTH COST	$0.00	$9.38
FEED COST	$1,528.31	$1,395.66
UTILITIES	$518.28	$525.61
OVERHEAD COST	$16,334.89	$12,955.65
DISTRIBUTION COST	$5,584.09	$16,565.88
TOTAL COST	$26,986.65	$23,678.64
COST/FISH	***$1.27***	***$1.09***

Appendix A. Production Lot Summaries.

BROWN TROUT -SODA LAKE				
LOT #	BNT-S-01	BNT-S-01	BNT-S-01	BNT-S-01
PROGRAM-CALENDAR YEAR-SIZE	STREAMS CY02 CAT	SMALL LAKES & PONDS CY02 CAT	MISSOURI RIVER CY02 CAT	LARGE RES. CY02 CAT
SOURCE	SODA LAKE, WY	SODA LAKE, WY	SODA LAKE, WY	SODA LAKE, WY
# **01/01/02**	21,345	215	13,945	*8,495*
WT.(LBS.)01 /01 /02	4,070	41	2,658	1,620
# STOCKED 2002	19,900	200	13,000	7,920
WT. STOCKED	9,326	98	4,243	3,987
WT. GAINED	5,256	57	1,585	2,367
CONVERSION	1.22	1.22	1.22	1.22
# **12/31/02**	0	0	0	0
WT. 12/31/02	0	0	0	0
FISH CULTURE MAN-HOURS	202	2	61	91
FISH CULTURE LABOR COST	$3,011.64	$32.56	$908.19	$1,356.27
SPAWNING COST	$0.00	$0.00	$0.00	$0.00
FISH HEALTH COST	$0.00	$0.00	$0.00	$0.00
FEED COST	$1,586.02	$17.20	$478.28	$714.25
UTILITIES	$550.32	$5.97	$165.96	$247.83
OVERHEAD COST	$17,344.76	$188.10	$5,230.46	$7,850.04
DISTRIBUTION COST	$6,515.73	$381.72	$5,049.73	$1,193.86
TOTAL COST	$29,008.38	$625.65	$11,832.26	$11,323.26
COST/FISH	***$1.46***	***$3.13***	***$0.91***	***$1.43***

Appendix A. Production Lot Summaries.

BROWN TROUT - SODA LAKE (CONT.)			
LOT #	BNT-S-02	BNT-S-02	BNT-S-02
PROGRAM-CALENDAR YEAR-SIZE	STREAMS CY03 CAT	SMALL LAKES & PONDS CY03 CAT	MISSOURI RIVER CY03 CAT
SOURCE	SODA LAKE, WY	SODA LAKE, WY	SODA LAKE, WY
# 01/01/02	29,700	300	15,000
WT.(LBS.)01/01/0	10	0.1	5
# STOCKED 2002	0	0	0
WT. STOCKED	0	0	0
WT. GAINED	3,495	44	2,478
CONVERSION	1.12	1.12	1.12
# 12/31/02	19,750	250	14,000
WT. 12/31/02	3,505	44	2,483
FISH CULTURE MAN-HOURS	254	3	180
FISH CULTURE LABOR COST	$4,059.95	$51.11	$2,878.56
SPAWNING COST	$0.00	$0.00	$0.00
FISH HEALTH COST	$0.00	$0.00	$0.00
FEED COST	$1,077.18	$13.56	$763.73
UTILITIES	$365.94	$4.61	$259.46
OVERHEAD COST	$11,533.31	$145.20	$8,144.34
DISTRIBUTION COST	$0.00	$0.00	$0.00
TOTAL COST	$17,036.48	$214.48	$12,079.08
COST/FISH	*$0.86*	*$0.86*	*$0.86*

Appendix A. Production Lot Summaries.

BROWN TROUT- SODA LAKE (CONT.)			
LOT #	BNT-S-03	BNT-S-03	BNT-S-03
PROGRAM-CALENDAR YEAR-SIZE	STREAMS CY04 CAT	SMALL LAKES & PONDS CY04 CAT	MISSOURI RIVER CY04 CAT
SOURCE	SODA LAKE, WY	SODA LAKE, WY	SODA LAKE, WY
# 01/01/02	0	0	0
WT.(LBS.)01/01/02	0	0	0
# STOCKED 2002	0	0	0
WT. STOCKED	0	0	0
WT. GAINED	3	0	2
CONVERSION	0	0	0
# 12/31/02	20,000	300	15,000
WT. 12/31/02	9	0.5	6
FISH CULTURE MAN-HOURS	23	0	16
FISH CULTURE LABOR COST	$367.38	**$4.88**	$245.00
SPAWNING COST	$27.90	$0.42	$20.92
FISH HEALTH COST	$6.11	$0.00	$4.08
FEED COST	$4.19	$0.00	$2.79
UTILITIES	$0.31	$0.00	$0.21
OVERHEAD COST	$9.90	$0.00	$6.60
DISTRIBUTION COST	$0.00	$0.00	$0.00
TOTAL COST	$415.79	$5.30	$279.60
COST/FISH	***$0.02***	***$0.02***	*S0.0 2*

Appendix A. Production Lot Summaries.

FALL CHINOOK SALMON			
LOT #	FCS-O-03	FCS-O-03	FCS-O-03
PROGRAM-CALENDAR YEAR-SIZE	MISSOURI RIVER CY03 SFG MONTANA	MISSOURI RIVER CY03 SFG SD	MISSOURI RIVER CY03 LFG SD
SOURCE	LAKE OAHE, SD	LAKE OAHE, SD	LAKE OAHE, SD
# 01/01/02	0		
WT.(LBS.)01/01/02	**0**		
# **STOCKED 2002**	0		
WT. STOCKED	0		
WT. GAINED	18	1	0
CONVERSION	1.16	1.16	1.16
# 12/31/02	240,000	13,000	5,000
WT. 12/31/02	178	10	3.5
FISH CULTURE MAN-HOURS	182	10	0
FISH CULTURE LABOR COST	$3,281.44	$182.30	$0.00
SPAWNING COST	$1,549.73	$86.10	$0.00
FISH HEALTH COST	$319.93	$17.77	$0.00
FEED COST	$58.41	$3.25	$0.00
UTILITIES	**$1.88**	$0.10	$0.00
OVERHEAD COST	$62.69	$3.31	$0.00
DISTRIBUTION COST	$0.00	$0.00	$0.00
TOTAL COST	$5,270.79	$292.82	$0.00
COST/FISH	***$0.02***	***$0.02***	***$0.00***

Appendix A. Production Lot Summaries.

LAKE TROUT	
LOT #	LAT-W-02
PROGRAM-CALENDAR YEAR-SIZE	LARGE RES. & LAKES CY02 LGF
SOURCE	STORY SFH, WY
# 01/01/02	10,000
WT.(LBS.)01/01/02	2.5
# STOCKED 2002	0
WT. STOCKED	0
WT. GAINED	1,420
CONVERSION	1.16
# 12/31/02	8,000
WT. 12/31/02	1,422
FISH CULTURE MAN-HOURS	197
FISH CULTURE LABOR COST	$3,187.62
SPAWNING COST	$0.00
FISH HEALTH COST	$0.00
FEED COST	$410.33
UTILITIES	**$148.68**
OVERHEAD COST	$4,685.96
DISTRIBUTION COST	$0.00
TOTAL COST	$8,432.59
COST/FISH	***$1.05***

Appendix B. Criteria for Determining the Cost per Thousand Fish at McNenny State Fish Hatchery.

1. Fish Culture Labor - labor cost attributed to fish culture activities. Includes specific labor for each lot and prorated general fish culture labor based on the number of pounds produced during the calendar year.

2. Overhead Labor - administration, equipment and building maintenance, information and education, leave, etc. prorated to each lot.

3. Spawning - specific spawning cost, including egg shipment costs.

4. Fish Health - includes diagnostic services conducted at the hatchery, inspection of feral brood stock whose progeny are raised at McNenny State Fish Hatchery, treatment labor, and chemicals used as therapeutics. All cost are lot specific.

5. State-Wide Fish Health Management - includes diagnostic services provided to other state and private hatcheries, annual inspections conducted for state and private hatcheries, fish kill investigations, reviewing and processing salmonid importation permits and private hatchery license applications, and providing consulting services to private aquaculture operations to protect the fishery resources of South Dakota.

6. Feed Cost - attributed to each lot.

7. Utilities - includes electric, telephone, and garbage service costs for McNenny and the satellite facility. Prorated to each hatchery lot based on the number of pounds produced during the calendar year.

8. Overhead - includes all travel, contractual services, supplies, materials, and capital assets that could not be attributed to the above categories. This cost is prorated for each hatchery lot based on the number of pounds produced during the calendar year.